Hu, Yi; **Keel, Sean**
Mori dream spaces and GIT. (English) Zbl 1077.14554
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Summary: The main goal of this paper is to study varieties with the best possible Mori theoretic properties (measured by the existence of a certain decomposition of the cone of effective divisors). We call such a variety a Mori dream space. There turn out to be many examples, including quasi-smooth projective toric (or more generally, spherical) varieties, many GIT quotients, and log Fano 3-folds. We characterize Mori dream spaces as GIT quotients of affine varieties by a torus in a manner generalizing Cox's construction of toric varieties as quotients of affine space. Via the quotient description, the chamber decomposition of the cone of divisors in Mori theory is naturally identified with the decomposition of the G-ample cone from geometric invariant theory. In particular every rational contraction of a Mori dream space comes from GIT, and all possible factorizations of a rational contraction can be read off from the chamber decomposition.

MSC:

14L24 Geometric invariant theory
14E30 Minimal model program (Mori theory, extremal rays)

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